

Title

Opportunities for faculty-librarian collaboration in an expanded dentistry curriculum

Running Title

Dental Hygiene-Librarian Collaboration

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Abstract

With the increased emphasis on evidence-based practice, developing information literacy (IL), as well as other literacies (e.g., oral), earlier in programs is becoming widely accepted in medicine and allied fields. However with long-standing programs integration of IL instruction is often unplanned at the programmatic level. This contributes to deficiencies in advanced students and frustrations for students and faculty. The Indiana University School of Dentistry has expanded its Dental Hygiene curriculum from a two-year program to a four-year Bachelor of Science. This expansion provided the opportunity to plan integration of information and oral health literacy instruction and evidence-based practice across the new curriculum. Library and Dental Hygiene faculty collaborated to adapt existing undergraduate and oral health pedagogies and assessments, as well as create new ones which are appropriate for integration into various courses. This expanded curriculum integrates lesson plans, assignments, and assessments that support dental hygiene and other health fields but also complement general education and provide transferrable skills for any major. Courses have heavy librarian integration, both in the classroom and the course management software, as well as asynchronous learning tools, with opportunities for team teaching and robust student assessment, including authentic assessment.

Background

The Indiana University School of Dentistry (IUSD) has been a leader in dental education since its inception in 1879 as The Indiana Dental College. Located on the Indiana University-Purdue University Indianapolis (IUPUI) campus, IUSD established its dental hygiene program in 1950. Today, the IUSD Dental Hygiene Program offers a Bachelor of Science degree in Dental Hygiene (BSDH). The three year evolution resulted in a BSDH curriculum that reflects the dental hygiene profession of today's balanced with a prescient view of the demands on the profession.

The BSDH curriculum committee drew inspiration from several calls for transformation in the profession (American Dental Hygienists' Association, 2015, 2016). However, the committee felt it imperative to go a step above these external recommendations and conduct research within their own program at IUSD. Research was conducted to identify where students felt less confident in abilities or identified gaps or weaknesses in preparation (Walker, Jackson, & Maxwell, 2016). Students reported "somewhat confident" or "not confident" in their writing skills compared to their verbal skills. Additionally, the authors noted students felt less well developed in nonverbal communication skills compared with verbal skills. Analyzing the responses helped identify the need to strengthen nonverbal communication skills and to increase instructor preparation prior to the second year of the program.

Objectives

There is an expectation that oral health professionals will be competent in searching, evaluating, and applying current scientific literature. Per the United States Commission on Dental Accreditation 2016 (CODA) 2-22: Graduates must be competent in the evaluation of current scientific literature (American Dental Association, 2016).

Intent: Dental hygienists should be able to evaluate scientific literature as a basis for life-long learning, evidenced-based practice and as a foundation for adapting to changes in healthcare.

Examples of evidence to demonstrate compliance may include:

- written course documentation of content in the evaluation of current and classic scientific literature
- evaluation mechanisms designed to monitor knowledge and performance
- outcomes assessment mechanisms

Between 2014 and 2016, calls for curricular change were happening in Dental Hygiene education within the professional accrediting agencies and journals. By 2017, there were calls to formally assess and develop this skill throughout the curriculum (Michael, 2017). Several published sources in dental education outlined the need for courses targeting evidence-based decision making (EBDM) (Osborne, Henley, Josey-Baker, & Fryer, 2014; Schoonheim-Klein, Wesselink, & Vervoorn, 2012; Northridge et al., 2016).

Evaluation of our own program revealed that students tended to lack fundamental information literacy (IL) knowledge necessary to properly understand EBDM. We determined a need to establish a baseline level of IL prior to the upper-level coursework. Expecting students to successfully demonstrate their research skills through their end-of-semester assignment, a literature review, required hours of preparation to reach a competency level where students felt comfortable independently completing the assignment. This discovery coincided with our curriculum development and reinforced our decision to move IL to earlier courses in the curriculum.

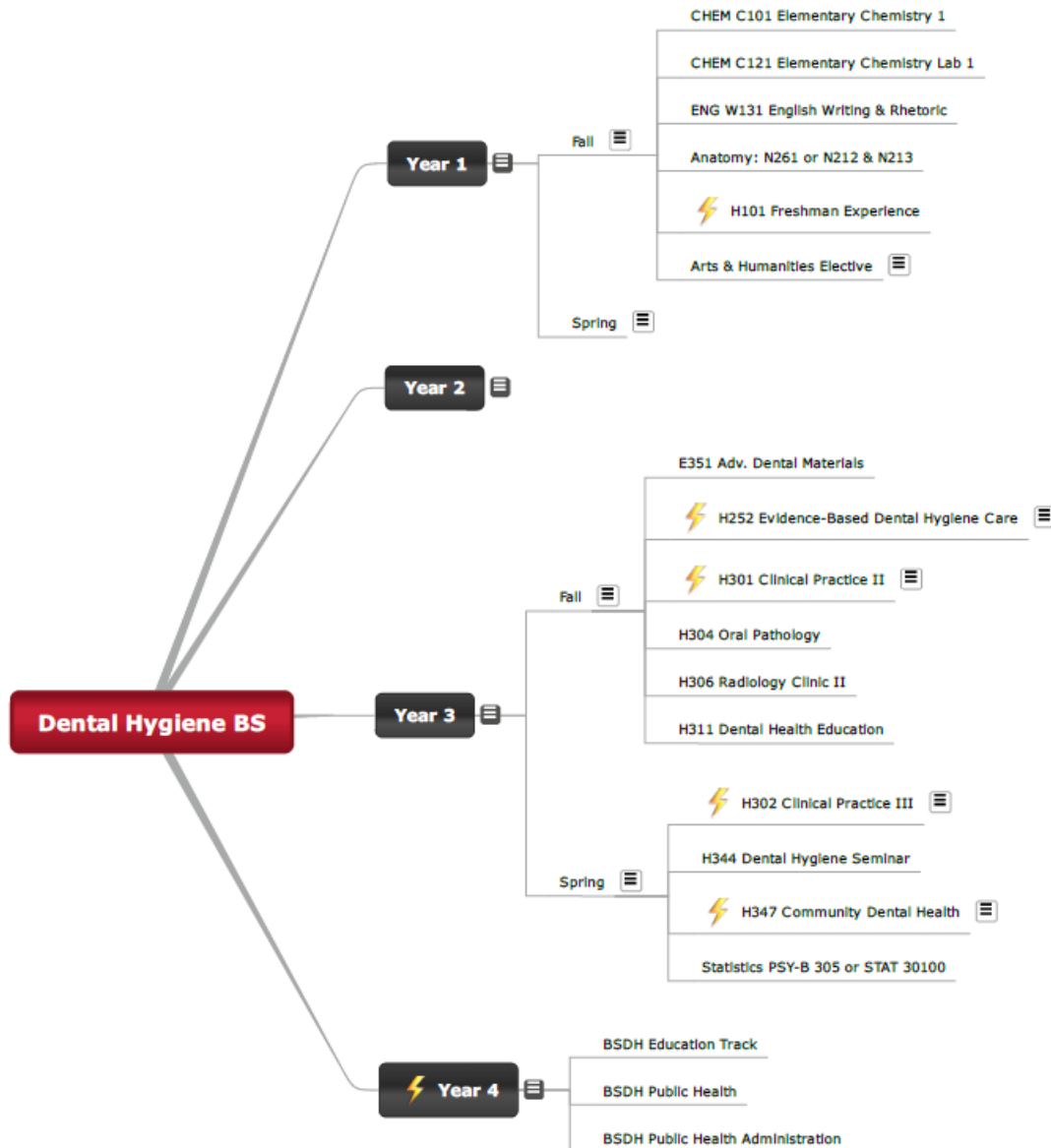
The administration recognized the Associate of Science Degree in Dental Hygiene (ASDH) presented challenges in its then-current format. For our purposes it was particularly challenging for the integration of IL instruction due to the lack of flexibility with the added courses. The three-year program emphasized clinic and science courses as well as attaining the highest possible GPA but lacked a course with formative IL assessments and few grading rubrics included IL language. Summative assessments were used to capture final papers or presentations. However, in the context of the courses, students were hesitant to “question assumptions” or conduct research that required synthesizing information where the intended purpose was not defined or linear. There was a commonly held belief by faculty that since all courses contained “information” and theoretically some sort of “research” that this would passively infuse students with the necessary IL competencies in spite of the limited IL content and assessment. These assumptions, held by many faculty in a variety of disciplines, led to faculty disappointment when students were not adequately prepared for advanced courses which required literature reviews, grant proposal writing, and evidence-based patient care. With limited IL skills, it was particularly challenging for students to build good EBDM skills.

Methods

The revamped Bachelor of Science in Dental Hygiene (BSDH) debuted at the beginning of the 2016 school year. The new curriculum was based largely on the old sequence of courses but developed with a more intentional focus on IL and evidence-based instruction at the course level. Part of this process involved mapping various competencies and expected learning outcomes to specific courses (Figure 1). This curriculum mapping identified courses that had, or could have, research content and IL instruction included. Some courses saw significant changes in content from the previous curriculum. Much of this was done with an eye to progressively build skills throughout the four-year curriculum in order for students to successfully complete the fourth-year capstone seminar. There are three different concentrations for capstone experiences (Education, Public Health, and Public Health Administration). Generally, students are not certain which they will follow until their final year. Therefore, it is necessary to scaffold content throughout the first three years to prepare students to succeed in any of the three tracks.

The first step was to better integrate librarians and existing library instruction resources at the critical early stages that were identified as lacking in the previous iteration of the curriculum. The dentistry librarian participated in the student orientation and other experiences and played an active role in instructing first-year students. Dental hygiene faculty collaborated with librarians to develop assignments and rubrics with IL learning objectives. Collaboration improved the IL language in assessments and provided a taxonomy that could be used to scaffold courses across the curriculum. Information Literacy rubrics were adapted for a variety of assignments that were robust enough to be used throughout the curriculum to track student growth.

Figure 1 - Dental Hygiene Curriculum Map



The curriculum map shows courses with IL content marked with lightning bolts including the three possible concentrations for the fourth year new to the BS degree.

Importantly, just before the development of the new dental hygiene curriculum, librarians at the main IUPUI campus library, University Library, had developed a common curriculum for the IUPUI program for new, incoming students known as “Summer Bridge.” This is a voluntary, pre-first-year summer program designed to better prepare incoming students for college life (<https://bridge.iupui.edu/>). Programmatic, assessable IL instruction with common learning outcomes had been developed for Bridge and was adapted to the dental hygiene first-year course (<http://iupui.campusguides.com/bridge>).

First-Year “Bridge” Common Learning Outcomes

- Formulate research question of an appropriate scope
- Find & Evaluate sources (i.e., popular v. scholarly)
- Cite sources

The adaptation of this common curriculum is particularly significant at the introductory level, H101, as the majority of students who begin college identifying as dental hygiene majors are not retained in the major after the first year. This means that first-year courses must be discipline specific enough to properly prepare students for the next level in the profession while providing IL skills general enough to be transferable to any discipline.

In the first semester of the first-year curriculum, students begin with an IL session that walks them through the research process including: developing a topic, determining search terms, choosing and searching a database, accessing and citing articles, and evaluating information. This involves completing an in-class worksheet (Appendix 1) which ensures that students leave the session with a topic, research strategy, and at least one appropriate source citation. Throughout the semester, students produce an annotated bibliography and a final research paper.

Table 1 - In-Class Assignment Rubric

Learning Outcome	Level of Achievement	Student Name:	Class:
	Developed 3	Emerging 2	Initial 1
Keywords & Synonyms	Sufficient keywords and synonyms <ul style="list-style-type: none"> • Multiple keywords identified • Multiple, appropriate synonyms identified for each keyword 	Insufficient keywords or synonyms <ul style="list-style-type: none"> • Limited identification of keywords • Few or improper synonyms 	Minimal keywords and no synonyms <ul style="list-style-type: none"> • No keywords beyond those used in the original question/topic • No viable synonyms found for the keywords
Article	Source materials are appropriate and scholarly <ul style="list-style-type: none"> • Article content seems appropriate for the proposed question/topic • Article is from an appropriate scholarly journal with an explanation of how the student determined this 	Source materials are inadequate or non-scholarly <ul style="list-style-type: none"> • Article is only tangentially related to the proposed question/topic OR • Article is not from a scholarly journal 	Source materials are inadequate and non-scholarly <ul style="list-style-type: none"> • Article is only tangentially related to the proposed question/topic • Article is not from a scholarly journal
Citation	Citation is complete and in the assigned style	Citation is incomplete or not in the assigned style	Citation is incomplete and not in the assigned style

Table 2 - Annotated Bibliography Rubric

	Level of Achievement		
	Developed 3	Emerging 2	Initial 1
Source Selection	Sources are highly relevant and useful for researching the stated topic.	Sources are somewhat relevant and useful for researching the stated topic.	Sources are not relevant or useful for researching the stated topic.
Annotation	Annotations do an excellent job of summarizing the content of the source and its relevance to the topic.	Annotations do an adequate job of summarizing the content of the source and its relevance to the topic.	Annotations do not adequately summarize the content of the source and its relevance to the topic.
Evaluation	The merits of each source are clearly stated. Sources fit the context of the topic.	The merits of some sources are clearly stated although some may lack some merits. Some sources may not fit the context of the topic.	The merits of most if not all sources are not clearly stated or lack merit. Sources do not fit the context of the topic.
Citation	Citations are complete and in the assigned style.	Citations are either incomplete or not in the assigned style.	Citations are incomplete and not in the assigned style.
Mechanics	Very few punctuation, spelling, or grammar errors.	Some punctuation, spelling, or grammar errors.	Many punctuation, spelling, or grammar errors.

The new curriculum incorporates extensive, scaffolded formative assessment which provides feedback to the student across the semester, not as one large summative assessment. Existing IL rubrics were adapted by the librarian and faculty member for in-class worksheets, annotated bibliographies, and research papers (Tables 1-3). Early in the research process, students are given immediate assessment of initial steps in their research process which gives them ample opportunity to incorporate feedback into formal writing. With the emphasis on formative assessment with small deadlines, students have more time and opportunity to reach out to faculty and librarians for support and use resources. In addition to more traditional research activities, first-year students create group presentations as part of their research process. This allows for peer feedback as well as keeping students engaged in the process despite having no point value applied to the drafts or peer review activities.

Table 3 - Final Paper Rubric

Student Name:	Class Section #:			
	Level of Achievement			
	Developed 3	Emerging 2	Initial 1	Total Score:
Format	Paper follows APA format and includes APA reference page.	Paper follows APA format with minimal errors (less than 3) and includes APA reference page.	Paper follows APA format with more than 3 errors, or does not follow APA format, or is missing APA reference page.	/3
Organization	Organization follows provided outline and provides information clearly in each area.	Organization mostly follows provided outline and provides information in each area with minimal confusion.	Organization does not follow provided outline and/or has information in wrong section or missing.	/3
Mechanics	Very few (2 or less) punctuation, spelling, or grammar errors.	Some punctuation, spelling, or grammar errors.	Many punctuation, spelling, or grammar errors.	/3
	Developed 3	Emerging 2	Initial 1	
Evaluation Intro	Excellent job of introducing the topic.	Adequate job of introducing the topic.	Does not adequately introduce the topic.	/3
Evaluation Epidemiological Triangle	Triangle is complete and accurate.	Triangle is complete but not accurate.	Triangle is not complete or accurate.	/3
Evaluation Statistics	Highly relevant and current.	Somewhat relevant and current.	Not relevant and/or current.	/3
Evaluation Personal Interview	The merit and relevance of source is clear.	Merit and relevance of source is not clear.	Relevance of source is to topic is not demonstrated.	/3
Evaluation Solution	Solution reflects knowledge of topic.	Solution does not reflect a clear understanding of the topic.	Solution is missing or does not reflect knowledge or relevance to the topic.	/3
Time management Draft Points	Submitted on time	10		/10
Time management Final Points	Submitted on time	6		/6
			Total Score	/40

The first-year experience is the first step in scaffolded IL across the new curriculum. The annotated bibliography and research paper in the first year prepares students for a literature review and table clinic in the third year, which prepares students for a case study, one of their required capstone projects in the fourth year.

While formative assessment is utilized extensively, a digital badging program was developed to be used at both the introductory and advanced level. Digital badging is a visual representation of an accomplishment designed to make incremental learning more visible. Badges are often incorporated into online course management or portfolio systems for students (<https://www.educause.edu/badging>). In addition to being a form of summative assessment, badges encourage and reward student effort beyond grades and stand as a visible achievement in their electronic portfolio. Badges created by the CyberLab at IUPUI were used for first-year badges for dental hygiene students reward things like: “Best Paper,” “Best Participant,” “Creative Thinker,” and “Critical Thinker” (Figure 2). Dental hygiene specific badges were created by CyberLab for advanced courses to reward students for points related to the Critical Thinking Accreditation Standards for Dental Hygiene Education Programs (American Dental Hygienists'

Association, 2016). Badges were designed and awarded through an academic social networking site, CourseNetworking (<https://www.thecn.com>).

Figure 2 - First-Year Badges



Discussion

As of fall 2017, we are still early in the deployment of the new curriculum: the students in their first year of the program are only the second cohort to experience the new first-year curriculum, with the first cohort of students entering their second year. While the impending new curriculum provided a good framework for curricular change, it was critical that we begin piloting assignments and assessments meant to be used in the new curriculum immediately. We were able to test much of the first year content over the last three years, making it possible to assess and refine new assignments and curriculum before the new curriculum was even implemented. With each successive class, we have been able to better adapt the assignments and assessments to the new curriculum. For example, the IL worksheet and how it is assessed has evolved significantly. Students now receive same-day feedback rather than having to wait until the next class period.

The curriculum contains elements specifically designed to ease student transition into the clinical aspects of the Dental Hygiene program. Students complete an E-portfolio that highlights aspects of their development across the semester. The areas include: about me (identity), career, academic, and co-curricular. The content in each area is designed to grow as the students complete assessments and experiences during the first semester. The formative assessment cycle was intentionally designed to mirror the rapid feedback cycle students experience when they enter clinic. In the clinic environment, their ability to convey knowledge and confidence when sharing information can impact their successful progression through competencies and is part of how their professional identity is formed (Cruess, Cruess, & Steinert, 2016). The curriculum design is based on the research findings that students who are prepared early and are able to observe their professional growth using an E-portfolio will be better prepared for the accelerated learning pace in the dental hygiene clinic, experience less stress, and be more likely to feel connected to their profession (Wallace, Blinkhorn, & Blinkhorn, 2013; Springfield, Smiler, & Gwozdek, 2015).

The success of the curriculum, which emphasizes early introduction to research and literature, is evident in the evolution of student language. As part of the first-year experience, students are asked to post journal entries and responses to various professional experiences in their e-portfolios. We were able to identify public health themes and professional language in the student journal reflections. Overall, instructors noted an increase in student ability to synthesize information earlier in the curriculum. Practically, this led to additional intraprofessional opportunities in the clinic courses and richer, more rewarding experiences for students.

Conclusion

Creating efficient, targeted IL and EB instruction is critical in dental hygiene education. Both require practice and must be intentionally scaffolded throughout the curriculum to meet the learner's competency level, and provide opportunities for growth and learning. Instructor feedback and rewards that go beyond grades, such as digital badging, provide appropriate, meaningful, and timely assessments to students. Librarian/faculty collaboration is a key component to making this work. This collaboration facilitates better assignment design and assessment for IL and allows for the librarian to be a useful and engaged resource for students.

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Start Your Research!
DH FYS**2016**

Throughout college and in your profession you'll be asked to come up with answers to questions. This process helps you find information to answer those questions.

1 : Define your question or topic.

Before you start it is important to have a **question** or **topic** in mind. This focuses your research and saves wasted time reviewing irrelevant material. Write down a question related to oral public health. If you can't think of one, you can base it on one of the topics discussed in the *Dimensions of Oral Hygiene* article: Alcohol, Smoking, Piercings, Nutrition, Sleep, or Stress.

Question or Topic: **2 : Break it down.**

A **researchable question** or **topic** has **core concepts** (usually nouns or noun phrases) that can be broken into different **keywords**. Identify up to three core concepts for your topic and **list two 1-2 synonyms or related ideas for each concept**.

	<i>Keywords</i>		<i>Synonyms</i>		<i>Synonyms</i>
Concept A	<input type="text"/>	=	<input type="text"/>	or	<input type="text"/>
Concept B	<input type="text"/>	=	<input type="text"/>	or	<input type="text"/>
Concept C	<input type="text"/>	=	<input type="text"/>	or	<input type="text"/>

3 : Find scholarly articles.

Search **Google Scholar** (scholar.google.com) to identify a **scholarly article** on your topic. (See **Research Guide > Evaluate** for tips on how to identify a scholarly article and other evaluation questions.)

Article Title _____ Year

Author(s) _____ Pages _____ Vol/Issue

Journal Title

How did you determine this was a scholarly article?

4 : Cite the article.

It is important to give credit to the ideas of others. You do this by citing your sources. Which style you use depends on the discipline. (See **Canvas > Library Research Guide > Citation Help** for more information on citation.)

Cite the article you found using APA style (which is commonly used to cite sources in the social sciences).

ARTICLE EXAMPLE: Scruton, R. (1996). The eclipse of listening. *The New Criterion*, 15(3), 5-13.

Your citation:

5 : Annotated Bibliographies

For next week you need to begin writing an annotated bibliography and it can begin with this article. The skills we learned today will help you find items to put in your bibliography. See your assignment and the **Annotated Bibliography Information Sheet** in Canvas.

6 : Librarians = free research help.

Ask me: Your Name | librarian@iupui.edu

Course Research Guide: See Canvas

Ask someone else: <https://www.ulib.iupui.edu/help/ask>

Worksheet design adapted from an original by Char Booth (charbooth@gmail.com)